

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C07K 1/00, 14/47, G06F 17/50, C07K 14/00	A3	(11) International Publication Number: WO 99/42474 (43) International Publication Date: 26 August 1999 (26.08.99)
(21) International Application Number: PCT/US99/03692		(81) Designated States: AU, BR, BY, CA, CN, CZ, HU, IL, IN, JP, KR, MX, NZ, PL, RU, SK, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) International Filing Date: 19 February 1999 (19.02.99)		
(30) Priority Data: 60/075,466 20 February 1998 (20.02.98) US		Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(71) Applicant: GENOME DYNAMICS, INC. [US/US]; 18247D Flower Hill Way, Gaithersburg, MD 20879-0921 (US).		
(72) Inventors: MICHAELS, George, S.; 13516 Sloan Street, Rockville, MD 20853 (US). MIKELSAAR, Raik-Hiio; Jakobsoni Street 11-4, EE2400 Tartu (EE). FELDMANN, Richard, J.; 17800 Mill Creek Drive, Derwood, MD 20855-1019 (US).		
(74) Agents: DRIVAS, Dimitrios, T. et al.; White & Case LLP, 1155 Avenue of the Americas, New York, NY 10036 (US).		

(54) Title: METHOD FOR DESIGNING DNA-BINDING PROTEINS OF THE ZINC-FINGER CLASS

(57) Abstract

The invention is directed to the design of DNA-binding proteins (DBP's) with capabilities of binding to any predetermined target double-stranded DNA sequence. Disclosed are the rules for design of the proteins; an algorithm for screening for the optimal DBP's; a computer system employing the rules and the algorithm; general formulae encompassing the proteins; and methods of use of the proteins.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CI	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/03692

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C07K1/00 C07K14/47 G06F17/50 C07K14/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C07K G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 32475 A (UNIV WASHINGTON ;CHENG CHENG (CA)) 17 October 1996 (1996-10-17) the whole document ---	1-14
A	WO 90 07862 A (PROTEIN ENG CORP) 26 July 1990 (1990-07-26) the whole document ---	1-14
A	BERG E.A.: "Proposed dstructure for the zinc-binding domains from transcription factor IIIA and related proteins" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol. 85, January 1988 (1988-01), pages 99-102, XP002112926 WASHINGTON US cited in the application the whole document ---	1-14

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

23 August 1999

02/09/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Groenendijk, M

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/03692

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KLEVIT E.A.: "Recognition of DNA by Cys2,His2 zinc fingers" SCIENCE, vol. 253, 1991, page 1367,1393 XP002112927 LANCASTER, PA US cited in the application the whole document -----	1-14
A	POMERANTZ E.A.: "STRUCTURE-BASED DESIGN OF A DIMERIC ZINC FINGER PROTEIN" BIOCHEMISTRY, vol. 37, no. 4, 27 January 1998 (1998-01-27), pages 965-970, XP002112928 EASTON, PA US the whole document -----	1-14
A	GOGOS E.A.: "Sequence discrimination by alteratively spliced isoforms of a DNA binding zinc finger domain" SCIENCE, vol. 257, 25 September 1992 (1992-09-25), pages 1951-1955, XP002112929 LANCASTER, PA US cited in the application the whole document -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

National Application No

PCT/US 99/03692

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9632475 A	17-10-1996	AU	5445296 A	30-10-1996
WO 9007862 A	26-07-1990	US	5096815 A	17-03-1992
		AU	4958890 A	13-08-1990
		CA	2045516 A	07-07-1990
		EP	0452413 A	23-10-1991
		JP	4504052 T	23-07-1992
		US	5198346 A	30-03-1993